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Dated 20 August 2003

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Request for grant of a patent

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22AUG02 E742931-1 D02903
P01/7700 0.00-0219568.3

1. Your reference — 11031P3 GB/AK

2. Patent application number *(The Patent Office will fill in this part)* — 0219568.3

22 AUG 2002

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Reckitt Benckiser Inc
1655 Valley Road
Wayne
New Jersey 07474
UNITED STATES OF AMERICA

Patents ADP number *(if you know it)* — 07852247001

If the applicant is a corporate body, give the country/state of its incorporation — Delaware

785 22400

Title of the invention — Improvements In and to Compositions

Name of your agent *(if you have one)*

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

John Crawford McKnight
Reckitt Benckiser plc
Group Patents Department
Dansom Lane
HULL
HU8 7DS
UNITED KINGDOM

Patents ADP number *(if you know it)* — 07799521001

If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number	Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application *(day / month / year)*	Date of filing *(day / month / year)*

Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

Yes

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Continuation sheets of this form	
Description	18
Claim(s)	5
Abstract	1
Drawing(s)	---

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	One
Request for substantive examination *(Patents Form 10/77)*	One
Any other documents *(please specify)*	FS2

11. I/We request the grant of a patent on the basis of this application.

Signature: gmcknight — Date: 20 August 2002

John C McKnight

12. Name and daytime telephone number of Person to contact in the United Kingdom: John C McKnight (01482) 583719

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IMPROVEMENTS IN AND TO COMPOSITIONS

The present invention relates to a liquid cleaning and/or disinfecting composition which is separated into two phases at rest where the phases are temporarily dispersed within each other upon shaking.

The background of liquid cleaning compositions of the type to which this invention is directed is discussed in WO99/47635, GB2134916, WO99/47634, WO00/24852, WO00/71665, WO01/21752, and WO01/21753. Other examples are found in GB1247189, EP116422 and EP175485.

Applicants have now found a liquid cleaning system having at least two phases wherein the components together provide for a composition having irritation mitigants. Herein, applicants have found new and inventive compositions which separate into two phases upon standing comprising

(a) at least one cationic surfactant having germicidal properties;

(b) at least one nonionic surfactant;

(c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof;

(d) at least one electrolyte;

(e) optionally, one or more components selected from pH buffers and agents, colorants, dyes, fragrances, fragrance stabilizers, and viscosity modifiers; and the remainder

water.

Applicants have found it surprising that good cleaning and/or sanitization and/or disinfection and clear and stable phase separation, even at elevated temperatures,

upon resting can be obtained with a low level amount of electrolyte and at the same time providing a composition having a low eye irritation level.

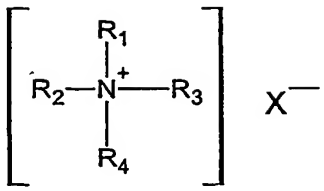
At least one cationic surfactant having germicidal properties, at least one nonionic surfactant and at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof, are all present in amounts of from about 0.01 to about 10wt%; about 0.1 to about 10wt%; and about 0.1 to about 10wt%, respectively.

Generally, the majority of the (a) at least one cationic surfactant having germicidal properties is found in the upper layer; the majority of (b) at least one nonionic surfactant is found in the upper layer; and the majority of the (c) at least one component having irritation mitigating properties selected from the group amphoteric surfactant, anionic surfactant, and mixtures thereof, is found in upper layer. The electrolyte(s) is generally found the lower layer. When present, the dye can be selected so that the upper layer will have the color of the dye and the lower layer will not have color.

In general, the size of each layer can range from 20/80 upper/lower to 80/20 upper/lower. In those instances where the layers may be of different sizes, amounts of the nonionic and/or electrolyte(s) can be varied in order to readjust the size of the layers.

Useful cationic surfactants having germicidal properties may be one or more of those described in, for example, *McCutcheon's Detergents and Emulsifiers,* North American and International Editions, 2001; *Kirk-Othmer, Encyclopedia of Chemical Technology,* 4th Ed., Vol. 23, pp. 478-541, the contents of which are herein incorporated by reference.

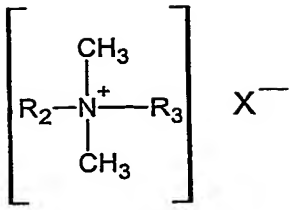
Examples of preferred cationic surfactant compositions useful in the practice of the instant invention are those which provide a germicidal effect to the concentrate compositions, and especially preferred are quaternary ammonium compounds and salts thereof, which may be characterized by the general structural formula:



where at least one of R_1, R_2, R_3 and R_4 is an alkyl, aryl or alkylaryl substituent of from 6 to 26 carbon atoms, and the entire cation portion of the molecule has a molecular weight of at least 165. The alkyl substituents may be long-chain alkyl, long-chain alkoxyaryl, long-chain alkylaryl, halogen-substituted long-chain alkylaryl, long-chain alkylphenoxyalkyl, arylalkyl, etc. The remaining substituents on the nitrogen atoms other than the above mentioned alkyl substituents are hydrocarbons usually containing no more than 12 carbon atoms. The substituents R_1, R_2, R_3 and R_4 may be straight-chained or may be branched, but are preferably straight-chained, and may include one or more amide, ether or ester linkages. The counterion X may be any salt-forming anion which permits water solubility of the quaternary ammonium complex.

Exemplary quaternary ammonium salts within the above description include the alkyl ammonium halides such as cetyl trimethyl ammonium bromide, alkyl aryl ammonium halides such as octadecyl dimethyl benzyl ammonium bromide, N-alkyl pryridinium halides such as N-cetyl pyridinium bromide, and the like. Other suitable types of quaternary ammonium salts include those in which the molecule contains either amide, ether or ester linkages such as octyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride, N-(laurylcocoaminoformylmethyl)-pyridinium chloride, and the like. Other very effective types of quaternary ammonium compounds which are useful as germicides include those in which the hydrophobic radical is characterized by a substituted aromatic nucleus as in the case of lauryloxyphenyltrimethyl ammonium chloride, cetylaminophenyltrimethyl ammonium methosulfate, dodecylphenyltrimethyl ammonium methosulfate, dodecylphenyltrimethyl ammonium chloride, chlorinated dodecylbenzyltrimethyl ammonium chloride, and the like.

Preferred quaternary ammonium compounds which act as germicides and which are found to be useful in the practice of the present invention include those which have the structural formula:



wherein R_2 and R_3 are the same or different C_8-C_{12} alkyl, or R_2 is C_{12-16} alkyl, C_{8-18}alkylethoxy, C_{8-18}alkylphenoxyethoxy and R_3 is benzyl, and X is a halide, for example chloride, bromide or iodide, or is a methosulfate or saccharinate anion. The alkyl groups recited in R_2 and R_3 may be straight-chained or branched, but are preferably substantially linear.

Useful quaternary germicides include compositions which include a single quaternary compound, as well as mixtures of two or more different quaternary compounds. Such useful quaternary compounds are available under the BARDAC®, BARQUAT®, HYAMINE®, CATIGENE, LONZABAC®, BTC®, and ONYXIDE® trademarks, which are more fully described in, for example, *McCutcheon's Functional Materials*, North American and International Editions, 2001, and the respective product literature from the suppliers identified below. For example, BARDAC® 205M is described to be a liquid containing alkyl dimethyl benzyl ammonium chloride, octyl decyl dimethyl ammonium chloride; didecyl dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (also available as 80% active (BARDAC® 208M)); described generally in *McCutcheon's* as a combination of alkyl dimethyl benzyl ammonium chloride and dialkyl dimethyl ammonium chloride); BARDAC® 2050 is described to be a combination of octyl decyl dimethyl ammonium chloride/didecyl dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (also available as 80% active (BARDAC® 2080)); BARDAC® 2250 is described to be didecyl dimethyl ammonium chloride (50% active); BARDAC® LF (or BARDAC® LF-80), described as being based on dioctyl dimethyl ammonium chloride (BARQUAT® MB-50, MX-50, OJ-50 (each 50% liquid) and MB-80 or MX-80 (each 80% liquid) are each described as an alkyl dimethyl benzyl ammonium chloride; BARDAC® 4250 and BARQUAT® 4250Z (each 50% active) or BARQUAT® 4280 and BARQUAT® 4280Z (each 80% active) are each described as alkyl dimethyl benzyl ammonium chloride/alkyl dimethyl ethyl benzyl ammonium

chloride; and BARQUAT® MS-100 described as being a mixture of tetradecyl dimethyl benzyl ammonium chloride/dodecyl dimethyl benzyl ammonium chloride/hexadecyl dimethyl benzyl ammonium chloride (100% solid (powder)). Also, HYAMINE® 1622, described as diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride (available either as 100% actives or as a 50% actives solution); HYAMINE® 3500 (50% actives), described as alkyl dimethyl benzyl ammonium chloride (also available as 80% active (HYAMINE® 3500-80); and HYAMINE® 2389 described as being based on methyldodecylbenzyl ammonium chloride and/or methyldodecylxylene-bis-trimethyl ammonium chloride. (BARDAC®, BARQUAT® and HYAMINE® are presently commercially available from Lonza, Inc., Fairlawn, NJ). BTC® 50 NF (or BTC® 65 NF) is described to be alkyl dimethyl benzyl ammonium chloride (50% active); BTC® 99 is described as didecyl dimethyl ammonium chloride (50% active); BTC® 776 is described to be myristalkonium chloride (50% active); BTC® 818 is described as being octyl decyl dimethyl ammonium chloride, didecyl dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (available also as 80% active (BTC® 818-80%)); BTC® 824 and BTC® 835 are each described as being of alkyl dimethyl benzyl ammonium chloride (each 50% active); BTC® 885 is described as a combination of BTC® 835 and BTC® 818 (50% active) (available also as 80% active (BTC® 888)); BTC® 1010 is described as didecyl dimethyl ammonium chloride (50% active) (also available as 80% active (BTC® 1010-80)); BTC® 2125 (or BTC® 2125 M) is described as alkyl dimethyl benzyl ammonium chloride and alkyl dimethyl ethylbenzyl ammonium chloride (each 50% active) (also available as 80% active (BTC® 2125-80 or BTC® 2125 M)); BTC® 2565 is described as alkyl dimethyl benzyl ammonium chlorides (50% active) (also available as 80% active (BTC® 2568)); BTC® 8248 (or BTC® 8358) is described as alkyl dimethyl benzyl ammonium chloride (80% active) (also available as 90% active (BTC® 8249)); ONYXIDE® 3300 is described as n-alkyl dimethyl benzyl ammonium saccharinate (95% active). CATIGENE series is described as mixtures of alkyl dimethyl benzyl ammonium chlorides/alkyl dimethyl ethyl benzyl ammonium chlorides/dialkyl dimethyl ammonium chlorides. (BTC®, ONYXIDE®, and CATIGENE are presently commercially available from Stepan Company, Northfield, IL (CATIGENE from Stepan Europe)). Polymeric quaternary ammonium salts based on these monomeric structures are also considered desirable for the present invention. One example is POLYQUAT®, described as being a 2-butenyldimethyl ammonium chloride polymer.

In some instances, it is beneficial to use only one cationic surfactant having germicidal properties while in other instances, it is beneficial to use more than one cationic surfactant, for example and not limited to , a mixture of two cationic surfactants. When it is beneficial to use more than one cationic surfactants, for example, a mixture of a dialkyl quaternary ammonium compound (for example, when R_1 and R_2 are each from about C_{10} to C_{16} and R_3 and R_4 are each methyl; further examples are described above and are well known to those skilled in the art) and an alkyl benzyl quaternary ammonium compound (examples of which are described above and are well known to those skilled in the art) can be used. In either instance, stable solutions are formed with defined phase separation but it has been found that using more than one cationic surfactant provides increased phase separation at room temperature and reduced phase shrinkage at elevated temperature.

Examples of suitable nonionic surfactants for (b) at least one nonionic surfactant include, inter alia, condensation products of alkylene oxide groups with an organic hydrophobic compound, such as an aliphatic compound or with an alkyl aromatic compound. The nonionic synthetic organic detergents generally are the condensation products of an organic aliphatic or alkyl aromatic hydrophobic compound and hydrophilic ethylene oxide groups. Practically any hydrophobic compound having a carboxy, hydroxy, amido, or amino group with a free hydrogen attached to the nitrogen can be condensed with ethylene oxide or with the polyhydration product thereof, polyethylene glycol, to form a water soluble nonionic detergent. Further, the length of the polyethenoxy hydrophobic and hydrophilic elements may be varied to adjust these properties.

One example of such a nonionic surfactant is the condensation product of one mole of an alkyl phenol having an alkyl group containing from 6 to 12 carbon atoms with from about 5 to 25 moles of an alkylene oxide. Another example of such a nonionic surfactant is the condensation product of one mole of an aliphatic alcohol which may be a primary, secondary or tertiary alcohol having from 6 to 18 carbon atoms with from 1 to about 10 moles of alkylene oxide. Preferred alkylene oxides are ethylene oxides or propylene oxides which may be present singly, or may be both present.

Additional examples of nonionic surfactants include primary and secondary linear and branched alcohol ethoxylates, such as those based on C_6-C_{18} alcohols which further

include an average of from 2 to 80 moles of ethoxylation per mol of alcohol. Examples include the Genapol® series of linear alcohol ethoxylates from Clariant Corp., Charlotte, NC. The 26-L series is based on the formula $RO(CH_2CH_2O)_nH$ wherein R is a mixture of linear, even carbon-number hydrocarbon chains ranging from $C_{12}H_{25}$ to $C_{16}H_{33}$ and n represents the number of repeating units and is a number of from 1 to about 12, such as 26-L-1, 26-L-1.6, 26-L-2, 26-L-3, 26-L-5, 26-L-45, 26-L-50, 26-L-60, 26-L-60N, 26-L-75, 26-L-80, 26-L-98N, and the 24-L series, derived from synthetic sources and typically contain about 55% C_{12} and 45% C_{14} alcohols, such as 24-L-3, 24-L-45, 24-L-50, 24-L-60, 24-L-60N, 24-L-75, 24-L-92, and 24-L-98N. From product literature, the single number following the "L" corresponds to the average degree of ethoxylation (numbers between 1 and 5) and the two digit number following the letter "L" corresponds to the cloud point in °C of a 1.0 wt.% solution in water.

It is to be understood that other nonionic surfactants other than those described above may also be used. By way of illustration, and not by way of limitation, examples include secondary C_{12}-C_{15} alcohol ethoxylates, including those which have from about 3 to about 10 moles of ethoxylation. Such are available in the Tergitol® series of nonionic surfactants (Dow Chemical, Midland, MI), particularly those in the Tergitol® "15-S-" series. Further exemplary nonionic surfactants include linear primary C_{11}-C_{15} alcohol ethoxylates, including those which have from about 3 to about 10 moles of ethoxylation. Such are available in the Tomadol® series of nonionic surfactants under the following tradenames: Tomadol 1-3 (linear C_{11} alcohol with 3 moles (average) of ethylene oxide); Tomadol 1-5 (linear C_{11} alcohol with 5 moles (average) of ethylene oxide); Tomadol 1-7 (linear C_{11} alcohol with 7 moles (average) of ethylene oxide); Tomadol 1-9 (linear C_{11} alcohol with 9 moles (average) of ethylene oxide); Tomadol 23-1 (linear $C_{12\text{-}13}$ alcohol with 1 mole (average) of ethylene oxide); Tomadol 23-3 (linear $C_{12\text{-}13}$ alcohol with 3 moles (average) of ethylene oxide); Tomadol 23-5 (linear $C_{12\text{-}13}$ alcohol with 5 moles (average) of ethylene oxide); Tomadol 23-6.5 (linear $C_{12\text{-}13}$ alcohol with 6.6 moles (average) of ethylene oxide); Tomadol 25-12 (linear $C_{12\text{-}15}$ alcohol with 11.9 moles (average) of ethylene oxide); Tomadol 25-3 (linear $C_{12\text{-}15}$ alcohol with 2.8 moles (average) of ethylene oxide); Tomadol 25-7 (linear $C_{12\text{-}15}$ alcohol with 7.3 moles (average) of ethylene oxide); Tomadol 25-9 (linear $C_{12\text{-}15}$ alcohol with 8.9 moles (average) of ethylene oxide); Tomadol 45-13 (linear $C_{14\text{-}15}$ alcohol with 12.9 moles (average) of ethylene oxide); Tomadol 45-2.25 (linear $C_{14\text{-}15}$ alcohol with 2.23 moles

(average) of ethylene oxide); Tomadol 45-7 (linear C_{14-15} alcohol with 7 moles (average) of ethylene oxide); Tomadol 91-2.5 (linear C_{9-11} alcohol with 2.7 moles (average) of ethylene oxide); Tomadol 91-6 (linear C_{9-11} alcohol with 6 moles (average) of ethylene oxide); Tomadol 91-8 (linear C_{9-11} alcohol with 8.3 moles (average) of ethylene oxide) (Tomah Products, Inc., Milton, WI).

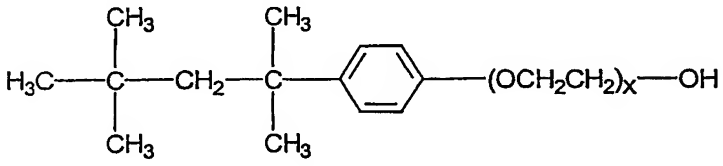
Other examples of alcohol ethoxylates which may be employed in the present invention are generally include the C_6-C_{15} straight chain alcohols which are ethoxylated with about 1 to 13 moles of ethylene oxide.

Examples include Alfonic® 810-4.5, which is described in product literature from Sasol North America Inc. as having an average molecular weight of 356, an ethylene oxide content of about 4.85 moles (about 60 wt.%), and an HLB of about 12; Alfonic® 810-2, which is described in product literature from Sasol North America Inc. as having an average molecular weight of 242, an ethylene oxide content of about 2.1 moles (about 40 wt.%), and an HLB of about 12; and Alfonic® 610-3.5, which is described in product literature from Sasol North America Inc. as having an average molecular weight of 276, an ethylene oxide content of about 3.1 moles (about 50 wt.%), and an HLB of 10. Product literature from Sasol North America Inc. also identifies that the numbers in the alcohol ethoxylate name designate the carbon chain length (numbers before the hyphen) and the average moles of ethylene oxide (numbers after the hyphen) in the product. These examples are typically C_6 -C_{11} straight-chain alcohols which are ethoxylated with from about 3 to about 6 moles of ethylene oxide.

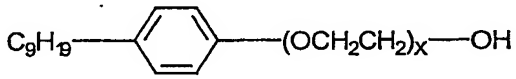
Another example of nonionic surfactant include alkyl glucosides and alkyl polyglucosides and mixtures thereof. Alkyl glucosides and alkyl polyglucosides are useful herein, and can be broadly defined as condensation articles of long chain alcohols, e.g., C8-30 alcohols, with sugars or starches or sugar or starch polymers i.e., glycosides or polyglycosides. These compounds can be represented by the formula $(S)_n$—O—R wherein S is a sugar moiety such as glucose, fructose, mannose, and galactose; is an integer of from about 1 to about 1000, and R is a C_{8-30} alkyl group. Examples of long chain alcohols from which the alkyl group can be derived include decyl alcohol, cetyl alcohol, stearyl alcohol, lauryl alcohol, myristyl alcohol, oleyl alcohol and the like. Commercially available examples of these surfactants include decyl polyglucoside

(available as APG 325 CS from Henkel) and lauryl polyglucoside (available as APG 600 CS and 625 CS from Henkel).

A further class of nonionic surfactants which may find use in the present inventive compositions include ethoxylated octyl and nonyl phenols include those having one of the following general structural formulas:



or,



in which the C_9H_{19} group in the latter formula is a mixture of branched chained isomers, and x indicates an average number of ethoxy units in the side chain. Particularly suitable non-ionic ethoxylated octyl and nonyl phenols include those having from about 7 to about 13 ethoxy groups. Such compounds are commercially available under the trade name Triton® X (Dow Chemical, Midland, MI), as well as under the tradename Igepal® (Rhodia, Princeton, NJ). One exemplary and particularly preferred nonylphenol ethoxylate is Igepal® CO-630.

A further class of materials surfactants which may be advantageously included in the inventive compositions are alkoxy block copolymers, and in particular, compounds based on ethoxy/propoxy block copolymers. Polymeric alkylene oxide block copolymers include nonionic surfactants in which the major portion of the molecule is made up of block polymeric C_2-C_4 alkylene oxides. Such nonionic surfactants, while preferably built up from an alkylene oxide chain starting group, and can have as a starting nucleus almost any active hydrogen containing group including, without limitation, amides, phenols, thiols and secondary alcohols.

One group of such useful nonionic surfactants containing the characteristic alkylene oxide blocks are those which may be generally represented by the formula (A):

$$HO—(EO)_x(PO)_y(EO)_z—H \qquad (A)$$

where EO represents ethylene oxide,
PO represents propylene oxide,
y equals at least 15,
$(EO)_{x+z}$ equals 20 to 50% of the total weight of said compounds, and,
the total molecular weight is preferably in the range of about 2000 to 15,000.

Another group of nonionic surfactants for use in the new compositions can be represented by the formula (B):

$$R—(EO,PO)_a(EO,PO)_b—H \qquad (B)$$

wherein R is an alkyl, aryl or aralkyl group, where the R group contains 1 to 20 carbon atoms, the weight percent of EO is within the range of 0 to 45% in one of the blocks a, b, and within the range of 60 to 100% in the other of the blocks a, b, and the total number of moles of combined EO and PO is in the range of 6 to 125 moles, with 1 to 50 moles in the PO rich block and 5 to 100 moles in the EO rich block.

Further nonionic surfactants which in general are encompassed by Formula B include butoxy derivatives of propylene oxide/ethylene oxide block polymers having molecular weights within the range of about 2000-5000.

Still further useful nonionic surfactants containing polymeric butoxy (BO) groups can be represented by formula (C) as follows:

$$RO—(BO)_n(EO)_x—H \qquad (C)$$

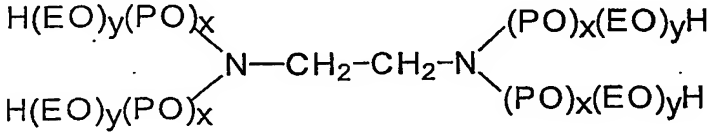
wherein R is an alkyl group containing 1 to 20 carbon atoms,
n is about 5-15 and *x* is about 5-15.

Also useful as the nonionic block copolymer surfactants, which also include polymeric butoxy groups, are those which may be represented by the following formula (D):

$$HO—(EO)_x(BO)_n(EO)_y-H \qquad (D)$$

wherein n is about 5-15, preferably about 15,
x is about 5-15, preferably about 15, and
y is about 5-15, preferably about 15.

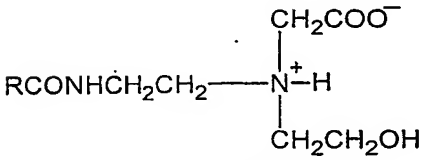
Still further useful nonionic block copolymer surfactants include ethoxylated derivatives of propoxylated ethylene diamine, which may be represented by the following formula:



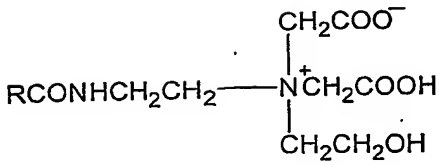
(E)

where (EO) represents ethoxy,
(PO) represents propoxy,
the amount of $(PO)_x$ is such as to provide a molecular weight prior to ethoxylation of about 300 to 7500, and the amount of $(EO)_y$ is such as to provide about 20% to 90% of the total weight of said compound.

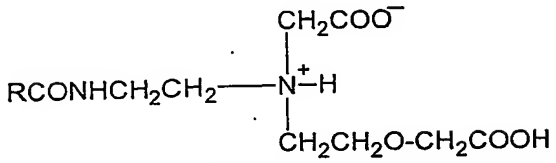
Useful (c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof include amphoteric surfactants for example alkylampho(mono)acetates having the formula



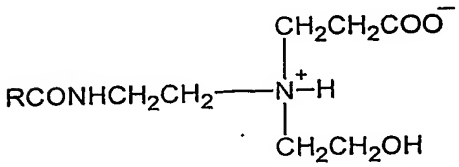
alkylampho(di)acetates having the formula



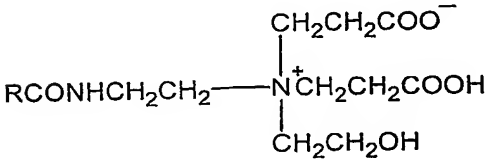
or



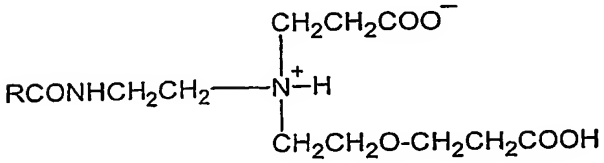
alkylampho(mono)proprionates having the formula



alkylampho(di)proprionates having the formula



or



In the above formulas, R represents a C_8 to C_{24} alkyl group, preferably a C_{10} to C_{16} alkyl group. Examples of these amphoteric surfactants can be found under the tradename Miranol from Rhodia (Cranbury, NJ). Some examples include Miranol C2M-Conc. NP, described to be disodium cocoamphodiacetate; Miranol FA-NP, described to be sodium cocoamphotacetate; Miranol DM, described to be sodium steroamphoacetate; Miranol

HMA, described to be sodium lauroamphoacetate; Miranol C2M, described to be cocoamphodiprioponic acid; Miranol C2M-SF, described to be disodium cocoamphodiproprionate; Miranol CM-SF Conc., described as being cocoamphopropriate; Mirataine H2C-HA, described as sodium lauiminodiproprionate; Miranol Ultra L-32, described as sodium lauroampho acetate; and Miranol Ultra C-37, described as sodium cocoampho acetate. Other amphoteric surfactants are also available under the tradename Amphoterge from Lonza (Fair Lawn, NJ) such as Amphoterge K described to sodium cocoamphoproprionate; Amphoterge K-2, described as disodium cocoamphodiproprionate; Amphoterge W, described to be sodium cocoamphoacetate; and Amphoterge W-2, described to be disodium cocoamphodiacetate.

Anionic surfactants can also be used as a component of (c). Examples of anionic surfactants include The anionic surfactant, when present, is selected from the following classes: alcohol sulfates and sulfonates, alcohol phosphates and phosphonates, alkyl ester sulfates, alkyl diphenyl ether sulfonates, alkyl sulfates, alkyl ether sulfates, sulfate esters of an alkylphenoxy polyoxyethylene ethanol, alkyl monoglyceride sulfates, alkyl sulfonates, alkyl ether sulfates, alpha-olefin sulfonates, beta-alkoxy alkane sulfonates, alkyl ether sulfonates, ethoxylated alkyl sulfonates, alkylaryl sulfonates, alkylaryl sulfates, alkyl monoglyceride sulfonates, alkyl carboxylates, alkyl ether carboxylates, alkyl alkoxy carboxylates having 1 to 5 moles of ethylene oxide, alkylpolyglycolethersulfates (containing up to 10 moles of ethylene oxide), sulfosuccinates, octoxynol or nonoxynol phosphates, taurates, fatty taurides, fatty acid amide polyoxyethylene sulfates, acyl glycerol sulfonates, fatty oleyl glycerol sulfates, alkyl phenol ethylene oxide ether sulfates, paraffin sulfonates, alkyl phosphates, isethionates, N-acyl taurates, alkyl succinamates and sulfosuccinates, alkylpolysaccharide sulfates, alkylpolyglucoside sulfates, alkyl polyethoxy carboxylates, and sarcosinates or mixtures thereof.

Further examples of anionic surfactants include water soluble salts or acids of the formula $(ROSO_3)_xM$ or $(RSO_3)_xM$ wherein R is preferably a C_6-C_{24} hydrocarbyl, preferably an alkyl or hydroxyalkyl having a C_{10}-C_{20} alkyl component, more preferably a C_{12}-C_{18} alkyl or hydroxyalkyl, and M is H or a mono, di or trivalent cation, e. g., an alkali metal cation (e. g., sodium, potassium, lithium), or ammonium or substituted ammonium

(e. g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like) and x is an integer, preferably 1 to 3, most preferably 1. Materials sold under the Hostapur and Biosoft trademarks are examples of such anionic surfactants.

Further examples of anionic surfactants include alkyl-diphenyl-ethersulphonates and alkyl-carboxylates. Other anionic surfactants can include salts (including, for example, sodium, potassium, ammonium, and substituted ammonium salts such as mono-, di-and triethanolamine salts) of soap, C_6-C_{20} linear alkylbenzenesulfonates, C_6-C_{22} primary or secondary alkanesulfonates, C_6-C_{24} olefinsulfonates, sulfonated polycarboxylic acids prepared by sulfonation of the pyrolyzed product of alkaline earth metal citrates, e. g., as described in British patent specification No. 1,082,179, C_6-C_{24} alkylpolyglycolethersulfates (containing up to 10 moles of ethylene oxide); alkyl ester sulfates such as C_{14-16} methyl ester sulfates; acyl glycerol sulfonates, fatty oleyl glycerol sulfates, alkyl phenol ethylene oxide ether sulfates, paraffin sulfonates, alkyl phosphates, isethionates such as the acyl isethionates, N-acyl taurates, alkyl succinamates and sulfosuccinates, monoesters of sulfosuccinate (especially saturated and unsaturated C_{12}-C_{18} monoesters) diesters of sulfosuccinate (especially saturated and unsaturated C_6-C_{14} diesters), acyl sarcosinates, sulfates of alkylpolysaccharides such as the sulfates of alkylpolyglucoside (the nonionic nonsulfated compounds being described below), branched primary alkyl sulfates, alkyl polyethoxy carboxylates such as those of the formula $RO(CH_2CH_2O)_kCH_2COO^-M^+$ wherein R is a C_8-C_{22} alkyl, k is an integer from 0 to 10, and M is a soluble salt-forming cation. Resin acids and hydrogenated resin acids are also suitable, such as rosin, hydrogenated rosin, and resin acids and hydrogenated resin acids present in or derived from tall oil. Further examples are given in "Surface Active Agents and Detergents" (Vol. I and II by Schwartz, Perry and Berch). A variety of such surfactants are also generally disclosed in U. S. Patent No. 3,929,678 to Laughlin, *et al.* at column 23, line 58 through column 29, line 23. The above anionic surfactants are presented in an illustrative rather than a limiting sense.

The electrolyte(s) are typically alkali and alkali metal salts and include, for example, sodium chloride, sodium carbonate, sodium bicarbonate, sodium citrate, and the like. The amount of electrolyte can range from about 0.01 to about 5.0wt%.

Various examples of the compositions of the present invention are shown below in Table 1.

In general terms, the components can be added in any order although it may be preferred to add first the water, then the cationic and nonionic surfactant(s), then any dye and/or fragrance, and finally the electrolyte(s). Alternatively, components forming the upper layer can be mixed as one admixture and the components forming the lower layer can be mixed as another admixture and then the two admixtures can be added to one container to form the biphasic system. Thus, for example, a first premix can be made containing, for example, amphoteric surfactant, a majority of at least one cationic surfactant having germicidal properties, a majority of the nonionic surfactant, dye (if desired), fragrance (if desired), and water. A second premix can be made containing at least one electrolyte, a very minor portion of at least one cationic surfactant having germicidal properties, a very minor portion of nonionic surfactant, and water.

Table 1

	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7	Ex. 8
Components (% active)	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%
Stepanate SXS (40%)[1]	1.00	1.00	1.00	1.00	1.00	0.60	0.00	1.00
BTC 8358 (80%)[2]	2.00	2.00	2.00	2.00	2.00	1.50	1.50	2.00
BTC 1010 (50%)[3]	-	-	-	-	1.00	-	-	2.00
Bardac 2250 (50%)[4]	-	-	-	1.00	-	1.80	2.00	-
Tomadol 45-7[5]	2.00	-	1.50	1.50	1.50	1.50	1.50	1.20
Alfonic 810-4.5[6]	-	1.50	-	-	-	-	-	-
NaCl[7]	0.30	0.20	-	0.40	0.40	0.15	1.50	0.10
Na Citrate[8]	-	-	7.00	-	-	2.00	-	-
Na_2CO_3[9]	0.30	0.20	-	0.80	0.80	-	1.00	0.80
$NaHCO_3$[10]	1.80	1.00	-	0.30	0.30	1.50	1.00	0.80
Dye (1%)	0.20	0.50	0.30	0.30	0.30	0.30	0.30	0.30
Fragrance	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
DI Water	92.10	93.30	87.90	92.40	92.40	90.35	90.90	91.50
Separation starts (minutes)	~20	~10	1-2	1-2	1-2	2-3	~8	~15
Upper layer at RT	80%	30%	40%	40%	30%	40%	52%	60%
Upper layer at 120F overnight	nd*	nd	21%	40%	30%	30%	33%	61%

Table 1 (cont'd)								
	Ex. 9	Ex. 10	Ex. 11	Ex. 12	Ex. 13	Ex. 14	Ex. 15	Ex. 16
Components (% active)	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%
Miranol Ultra L-32 (32%)[11]	1.50	2.00	-	-	-	2.20	2.20	2.00
Miranol C2M NP (40%)[12]	-	-	2.00	2.00	2.00	-	-	
BTC 8358 (80%)	2.00	0.50	0.80	0.50	0.52	0.65	0.60	0.50
BTC 1010 (50%)	2.00	2.40	2.00	2.40	2.40	2.40	2.40	2.40
Tomadol 45-7	1.00	-	1.00	-	-	-	-	
Genapol 26-L-50[13]	-	-	-	0.40	1.20	-	1.20	
Genapol 26-L-60[14]	-	1.20	-	0.80	-	1.20	-	
Genapol 26-L-80[15]								1.20
NaCl	0.80	-	0.10	0.26	0.26	0.25	0.19	0.20
Na Citrate	-	0.35	-	-	-	-	-	
Na_2CO_3	1.20	-	1.00	-	-	-	-	
$NaHCO_3$	1.20	-	-	-	-	-	-	
Dye (1%)	0.30	0.30	0.30	0.28	0.28	0.28	0.28	0.28
Fragrance	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
DI Water	89.70	92.95	92.50	93.06	93.04	92.72	92.83	93.12
Separation starts (minutes)	~5	~5	1-2	nd*	1-2	1-2	1-2	nd
Upper layer at RT	54%	56%	42%	44%	41%	48%	43%	38%
Upper layer at 120F overnight	39%	26%	26%	35%	35%	42%	40%	36%

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Table 1 (cont'd)								
	Ex. 17	Ex. 18	Ex. 19	Ex. 20	Ex. 21	Ex. 22	Ex. 23	Ex. 24
Components (% active)	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%
Miranol Ultra L-32 (32%)	1.76	1.76	1.60	1.00	1.00	1.00	0.80	2.00
BTC 8358 (80%)	0.48	0.48	0.43	0.40	0.40	0.40	0.40	0.50
BTC 1010 (50%)	1.92	1.92	1.73	1.80	2.00	2.20	2.10	2.40
Genapol 26-L-50								0.40
Genapol 26-L-60	-	1.00	-	-	-	-	-	
Genapol 26-L-80	1.00	-	1.00	-	-	-	-	0.80
Unitol L/80[16]	-	-	-	1.20	1.20	1.05	1.05	
NaCl	0.40	0.19	0.44	0.70	0.64	0.50	0.72	0.20
Dye (1%)	0.20	0.20	0.20	0.08	0.23	0.23	0.23	0.28
Fragrance	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.30
DI Water	93.96	94.17	94.32	94.54	94.25	94.34	94.42	93.12
Separation starts (minutes)	~ 10	~10	15	nd	nd	nd	nd	nd
Upper layer at RT	38%	44%	37%	48%	46%	43%	38%	43%
Upper layer at 120F overnight	30%	40%	26%	24%	29%	43%	39%	41%

* not determined .

[1] sodium xylene sulfonate (Stepan)
[2] n-alkyl dimethyl benzyl ammonium chloride (n-alkyl: 50% C_{14}; 40% C_{12}; 10% C_{16}; Stepan)
[3] didecyl dimethyl ammonium chloride (Stepan)
[4] didecyl dimethyl ammonium chloride (Lonza)
[5] linear C_{14-15} alcohol with 7 moles (average) of ethylene oxide (Tomah)
[6] C_8 -C_{10} straight-chain alcohols ethoxylated with about 4.85 moles of ethylene oxide (Sasol)
[7] sodium chloride
[8] sodium citrate
[9] sodium carbonate
[10] sodium bicarbonate
[11] sodium lauroampho acetate (Rhodia)
[12] disodium cocoampho diacetate (Rhodia)
[13] linear alcohol ethoxylate (Clariant)
[14] linear alcohol ethoxylate (Clariant)
[15] linear alcohol ethoxylate (Clariant)
[16] ethoxylated lauryl alcohol (Oxiteno)

One exemplified composition was evaluated for and compared against other cleaners for vinyl tile cleaning using the method provided for under ASTM D-4488-89 Annex A5 for particulate soil, which evaluated the efficacy of the cleaning compositions on vinyl tile samples. The soil applied was an oily particulate soil sample containing natural humus, paraffin oil, used crankcase motor oil, Portland cement, silica, lampblack carbon, iron oxide, bandy black clay, stearic acid, and oleic acid produced according to the protocol. Each of the soiled test vinyl tile samples were placed into the apparatus and the center of each tile was wetted with a 20 milliliter sample of a test formulation and allowed to stand for 1 minute. When approximately 30 seconds had elapsed, a further 50 milliliter sample was applied to the sponge (water dampened, then wrung to remove excess water) of a Gardner Abrasion Tester apparatus. Thereafter the apparatus was cycled 10 times, which provided 20 strokes of the sponge across the face of each of the vinyl test tiles. The reflectance values of the cleaned samples at 10 cycles were evaluated utilizing a Minolta Chroma Meter CF-110, with Data Processor DP-100, which evaluated spectrophotomic characteristics of the sample. The results are shown in Table 2 below.

	Dilution	Soil Removal %	+ Δ %
Ex. 15	1:16	73.90	14.60
	1:64	49.40	12.90
PineSol	1:64	57.71	8.33
Mr Clean	1:64	47.50	23.40

The compositions of the present invention can be used as a ready to use composition, supplied in a pour bottle or trigger bottle having a pump sprayer (in either use, a suitable container containing an amount of the two phase composition is first shaken to intermix the two layers and then the intermixed composition is then ready for use, either pouring on a surface and wiping, spraying on a surface and wiping, pouring on a wipe and then wiping a surface or spraying on a wipe and then wiping the surface) or can be supplied as a concentrate suitable for dilution in a larger container of water (after the concentrate is shaken to temporarily intermix the two layers). The compositions of the present invention will have good cleaning properties against dirt and stains commonly found in household, commercial and residential settings.

The compositions of the present invention also have good antimicrobial activity as evaluated using the AOAC Use Dilution Testing protocol.

Table 3

	Organism	Results
Ex. 8 - dilution 1:64		
	Staphylococcus aureus	0/10
	Salmonella	1/10
	Psuedomonas	0/10
Ex. 9 - dilution 1:64		
	Staphylococcus aureus	1/10
	Salmonella	0/10
	Psuedomonas	1/10
Ex. 13 - dilution 1:16		
	Staphylococcus aureus	0/10
	Salmonella	0/10
	Psuedomonas	1/10
Ex. 14 - dilution 1:16		
	Staphylococcus aureus	0/10
	Salmonella	0/10
	Psuedomonas	1/10
Ex. 15 - dilution 1:16		
	Staphylococcus aureus	0/10
	Salmonella	0/10
	Psuedomonas	2/10

Claims:

1. A composition which separates into two phases upon standing comprising

(a) at least one cationic surfactant having germicidal properties;

(b) at least one nonionic surfactant;

(c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof;

(d) at least one electrolyte;

(e) optionally, one or more components selected from pH buffers and agents, colorants, dyes, fragrances, fragrance stabilizers, and viscosity modifiers; and the remainder

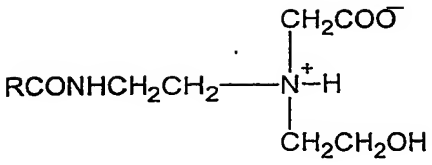
water.

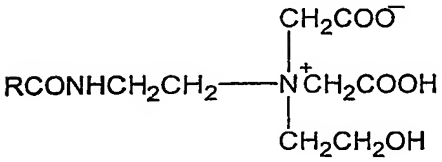
2. The composition according to claim 1 wherein upper phase contains mostly (a) at least one cationic surfactant having germicidal properties.

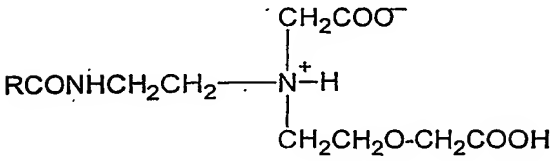
3. The composition according to claim 2 wherein upper phase contains mostly (c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof.

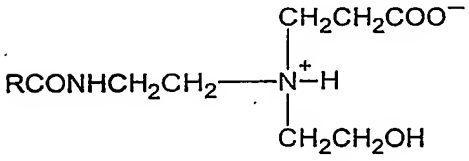
4. The composition according to claim 3 wherein (c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof is an amphoteric surfactant.

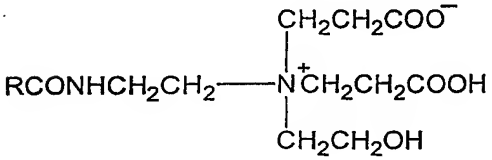
5. The composition according to claim 4 wherein the amphoteric surfactant is selected from the group having the formulas

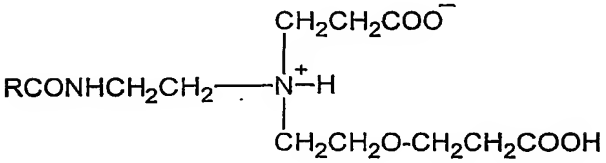










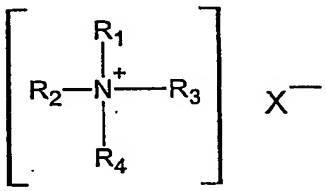


wherein R is C_8 to C_{24} alkyl.

6. The composition according to claim 3 wherein (c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof is an anionic surfactant.

7. The composition according to claim 1 wherein the amount of (d) at least one electrolyte is present in an amount of from about 0.01 to about 5.0wt%.

8. The composition according to claim 1 wherein (a) at least one cationic surfactant having germicidal properties has the formula



where at least one of R_1, R_2, R_3 and R_4 is an alkyl, aryl or alkylaryl substituent of from 6 to 26 carbon atoms, X is an anion and the entire cation portion of the molecule has a molecular weight of at least 165.

9. The composition according to claim 1 wherein (a) is two cationic surfactants having germicidal properties.

10. The composition according to claim 1 wherein (a) at least one cationic surfactant having germicidal properties is present in an amount of from about 0.01 to about 10wt%.

11. The composition according to claim 1 wherein (b) at least one nonionic surfactant is present in an amount of from about 0.1 to about 10wt%.

12. The composition according to claim 1 wherein (c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof is present in an amount of from about 0.1 to about 10wt%.

13. A composition which separates into two phases upon standing comprising

(a) at least one cationic surfactant having germicidal properties present in an amount of from about 0.01 to about 10wt%.;

(b) at least one nonionic surfactant present in an amount of from about 0.1 to about 10wt%;

(c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof is present in an amount of from about 0.1 to about 10wt%;

(d) at least one electrolyte present in an amount of from about 0.01 to about 5.0wt%;

(e) optionally, one or more components selected from pH buffers and agents, colorants, dyes, fragrances, fragrance stabilizers, and viscosity modifiers; and the remainder

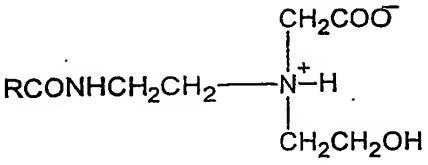
water.

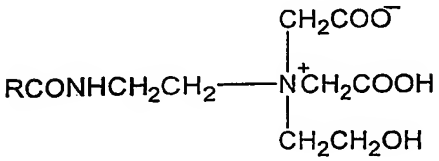
14. The composition according to claim 13 wherein upper phase contains mostly (a) at least one cationic surfactant having germicidal properties.

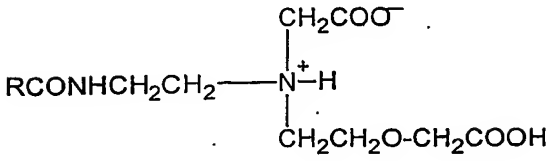
15. The composition according to claim 13 wherein upper phase contains mostly (c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof.

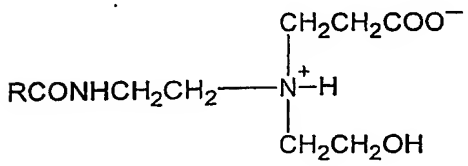
16. The composition according to claim 13 wherein (c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof is an amphoteric surfactant.

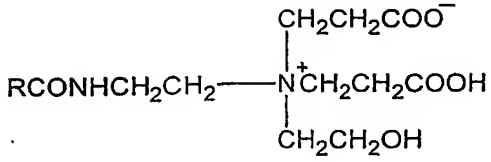
17. The composition according to claim 4 wherein the amphoteric surfactant is selected from the group having the formulas

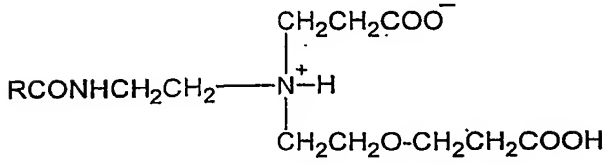












wherein R is C_8 to C_{24} alkyl.

18. The composition according to claim 3 wherein (c) at least one component having irritation mitigating properties selected from the group of amphoteric surfactant, anionic surfactant, and mixtures thereof is an anionic surfactant.

Abstract

IMPROVEMENTS IN AND TO COMPOSITIONS

A cleaning and/or disinfecting composition which separates into two phases upon standing is provided.